

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
29 December 2004 (29.12.2004)

PCT

(10) International Publication Number
WO 2004/114498 A3

(51) International Patent Classification⁷: **H02K 5/132**,
9/19, F04D 13/10

(21) International Application Number:
PCT/GB2004/002668

(22) International Filing Date: 21 June 2004 (21.06.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
0314555.4 21 June 2003 (21.06.2003) GB

(71) Applicant (for all designated States except US): **WEATHERFORD/LAMB, INC.** [US/US]; 515 Post Oak Blvd., Suite 600, Houston, TX 77027 (US).

(71) Applicant (for IS only): **HARDING, Richard, Patrick** [GB/GB]; Marks & Clerk, 4220 Nash Court, Oxford Business Park South, Oxford Oxfordshire OX4 2RU (GB).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **YURATICH, Michael, Andrew** [US/GB]; 14 Old Priory Close, Hamble Hampshire SO31 4QP (GB).

(74) Agent: **HARDING, Richard Patrick**; Marks & Clerk, 4220 Nash Court, Oxford Business Park South, Oxford Oxfordshire OX4 2RU (GB).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

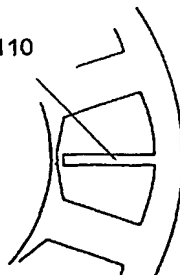
- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

(88) Date of publication of the international search report:
3 March 2005

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: **ELECTRIC SUBMERSIBLE PUMPS**

3110



(57) Abstract: A downhole electric motor for a submersible pump has at least three phases and comprises a permanent magnet rotor and a stator bearing phase windings (A, B and C) in slots in the stator. Each phase winding (A, B, C) incorporates a coil extending through a respective pair of adjacent stator slots and surrounds a respective portion of the stator between the slots. Furthermore adjacent coils of each pair of phase windings (A, B, C) extend through opposite parts of a respective one of the slots, so that these coils extend alongside one another in the slot, either being separated by a gap through which cooling fluid may be pumped to cool the coils, or being separated by a thermally conductive projection, with which the coils are in thermal contact, extending at least part of the way across the slot. Such a winding arrangement is advantageous in ensuring that the motor has a long life.

WO 2004/114498 A3